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STUDIES ON THE FIREFLY, IV: TEN NEW LAMPYRIDS  
FROM JAMAICA

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BARBER'S (1941) key to the lampyrid fireflies of Jamaica contains brief descriptions of 38 new species and subspecies, mainly from my 1936 collection. The purpose of the present paper is to describe 10 additional species that were recognized in a much more extensive collection made in July and August 1941.<sup>1</sup> Mr. Barber and I have in preparation a monograph that will include all previously published information on Jamaican fireflies, a revised key, and extensive data on the habits and distributions of the forms considered. We regard this latter type of information of very great importance for an adequate understanding of a lampyrid fauna.

MATERIAL, METHODS, AND TERMINOLOGY

The descriptions were made from dried and mounted specimens, although I tried to include as many characters as possible that can be seen in fresh samples or with a minimum of microscopical observation. In many instances, however, a positive identification cannot be made without careful microscopical study of certain basic anatomical features, and for this a brilliant spotlight and a binocular dissecting microscope with magnification up to 50 diameters are necessary. As emphasized by Barber (1941), the mode of preservation of fresh

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samples is of vital importance in obtaining specimens suitable for adequate study. All the descriptions presented below, except that of *Diphotus darlingtoni*, are based on specimens prepared by the following technique, which produces samples far superior to ordinary pinned material in cleanness, flexibility, and preservation of natural form and color: Place the specimen alive in at least 10 volumes of 70 percent alcohol and leave for several days or longer; extend the abdomen and hook out the aedeagus with a bent-tipped micropin so that both surfaces are fully displayed (if it becomes detached, cement on a hair and mount with the specimen); place in 95 percent alcohol, one hour; absolute alcohol (2 changes), overnight to several days; benzene, 10 minutes; allow to dry on porous tile or filter paper; mount on point with cellulose acetate cement diluted with amyl acetate.

The male has been used as the basis of classification since males are almost always very much more abundant in collections than females (perhaps because it is usually only the male that flies and flashes spontaneously), and because when several species are active at the same time and place, females cannot always be associated with males of the same species. Following Barber (1941) particular weight has been given to the morphology of the male copulatory apparatus (aedeagus). In most cases this evidence merely confirms conclusions that are indicated by habitus and other morphological evidence, but occasionally it is particularly valuable in suggesting affinities not otherwise obvious and, conversely, in separating forms superficially very similar. However, a statistical analysis of aedeagal dimensions in populations of four "subspecies" of *Photinus evanescens* Barber (Buck, 1942) shows that the aedeagus is no less variable in form than most other structures and indicates that too much importance should not be attached to minor variations in contour.

In most instances I have followed the terminology of Torre-Bueno (1937). For the aedeagus I use, like Barber (1941), the standard notation of Sharp and Muir (1912), as follows (using *Photinus lewisi*, pl. 2, fig. 11, as an example): The aedeagus consists of two *lateral lobes* (LL), which lie on each side of and may partly enclose the single *median lobe* (ML). The lateral lobes are typically heavily sclerotized, except perhaps at their extreme tips, and are rigid, though jointed at their basal ends (anteriorly) and movable in life by means of complex muscles within the *basal piece* (B) of the aedeagus. The lateral lobes accordingly may be found spread apart laterally to different degrees in different specimens. The median lobe is usually sclerotized dorsally and laterally, membranous ventrally. The function of the lateral lobes is thought to be to spread the female aperture and guide into it the tubelike *internal sac* (pl. 2, fig. 12a, IS), which during mating emerges from the tip of the median lobe. Actually, the internal sac is rarely

seen extruded. On both lateral and median lobes accessory structures such as hooks, knobs, and teeth may be present. By "length of lateral lobe" is meant the distance from its apex (posterior end) to the nearest part of the basal piece.

It is difficult to make generic generalizations concerning the aedeagus, but *Photinus* seems to differ from *Diphotus* in having lateral lobes that in dorsal aspect are close together only in their basal third or less and are usually widely separated distally except at their apices, which curve evenly close together. In *Diphotus*, on the other hand, the lateral lobes are generally rather straight-sided in both margins and are usually close to each other dorsally throughout most of their lengths. In *Photinus* the functional orifice of the median lobe is dorsal; in *Diphotus* it is ventral.

All the drawings of aedeagi were made under a 16-mm. objective with a camera lucida at magnifications of 130 to 200 diameters. Reproduced sizes can be judged from the  $\frac{1}{2}$ -millimeter scale lines included with each set of drawings.

In regard to color I use "white" to include also very pale gray or very light yellow (in contrast to "light brown," implying straw, pale tan, or khaki), and "black" to include also very dark brown (in distinction to "dark brown," which I use to include chocolate, rich brown, or sepia).

Properties of the chitinous surface are described with considerable reservation because the decisions as to whether a surface is studded with minute elevations or with minute depressions, or whether it is glossy or dull, often rests solely on the type of illumination used and is further obscured by the degree of pubescence of the surface, which is itself difficult to determine and describe accurately.

Length measurements always precede width. Length of the insect as a whole is always given as from the apex of the pronotum to the apices of the elytra and is ordinarily obtained by measuring pronotum and elytra separately, then adding, because the body is often flexed at the promesothoracic joint in pinned specimens.

The terms "sternites" and "tergites" as used herein refer always to the abdomen. In the Lampyridae the first sternite is vestigial or obsolete, sternite 2 being the first visible. In the male, sternite 9 is reduced in size and hidden beneath tergite 8, the pygidium, forming part of the sheath of the aedeagus. Likewise tergites 9 and 10 are reduced, fused, and usually hidden under the pygidium as part of the aedeagal sheath.

Head and eye dimensions were measured at 40 diameters with a micrometer ocular, the eye in the anteroposterior axis (though firefly eyes are nearly always round in lateral aspect) and the head from the front (i. e., the greatest distance from the most lateral surface of one

eye to that of the other). The degree of divergence of the anterior inner margins of the eyes, dorsal to the antennal sockets a distance about equal to the radius of the eye, was found to be a useful character. The frons was measured at the level of the antennae. The frons is often much hollowed, the concavity being, in the forms here studied, a measure of the relative size of the eyes to the head as a whole, as is usually also the degree of divergence of the interocular margins (which is in general greater, the smaller the eyes). The reader should recall that the size of the eyes in most male fireflies greatly exceeds that in the female, so that the frons usually differs markedly in shape in the two sexes.

A valuable key character, used also by Barber, is the coloration of the two small, polygonal, basolateral mesonotal plates (pl. 3, fig. 21, *MP*) situated anterolaterally to the scutellum (*SC*) in the space between the pronotum (*PR*) and the articulations of the elytra (*EL*) and usually partly covered by the hind margin of the former.

In *Photuris*, *Photinus*, and *Presbyolampis* there often occurs one or two robust conical sclerotized elongated spurs, movable in fresh material, which originate in the tarsal socket behind and project distally beyond the ventral surface of the distal end or rim of the tibia (pl. 2, fig. 16). These spurs, which are to be distinguished from those occurring in *Diphotus* and *Microdiphot* (pl. 2, figs. 17-19) described below, are prominent in some species of *Photinus*, but in others they are so inconspicuous as to require exhaustive microscopical search. The spurs were studied carefully in all species where a large series was available, particularly in *Photinus pallens* (Fabricius, 1798) and *Photuris jamaicensis* E. Olivier, 1886, where they are very prominent, and their distribution was found to be absolutely constant intraspecifically not only as to over-all pattern but also as to position of the individual spurs. Moreover, male and female were found to show the same pattern. I feel therefore that the distributional pattern of tibial spurs, since it differs in different species, is a useful specific character. However, it must be confessed that in species which are very small or in which the spurs are difficult to distinguish from ordinary hairs because of similar coloration (e. g., *P. lewisi*) there occasionally appear to be discrepancies in distribution both between different individuals and between the two legs of a pair.

The shapes of the maxillary and labial palps are quite distinctive and could probably be used as specific characters, but for lack of space for illustrations I have used only their coloration. The terminal segment of the larger maxillary palp is usually subconical with one side produced to an edge, whereas that of the labial palp varies in shape from rectangular (e. g., in *Photinus nothoides*) through triangular or hastate (e. g., *P. elisabethae*) to mitten-shaped (*Diphotus masti*).

A short mention ("Field Characters") of certain prominent characteristics heads each description. This is intended only as an aid to preliminary identification, not as a key or diagnosis.

The numbers following the individual descriptions refer, unless otherwise noted, to the U. S. National Museum collection, where the specimens are deposited.

#### LOCALITIES

Studies on intra- and interspecific relationships, such as the work on *Photinus evanescens* Barber (1941) already mentioned (Buck, 1942), require precise knowledge of geographical distribution. Since most of the localities visited in 1941 were in very inaccessible semiwilderness regions, a brief description of each, alphabetically arranged, is included. Some of the mentioned place names refer to those on the map of Jamaica prepared by the Public Works Department and issued by the Jamaica Automobile Association, but the names of some of the more obscure localities can be found only on manuscript maps in the Institute of Jamaica. The name in parentheses after the place name is that of the parish. For a better understanding of the geography of the high peaks of the Blue Mountain Range, where much of the collecting was done, it should be stated that the main ridge runs roughly west-east, with John Crow (6,000 feet), Bellevue (6,000 feet ?), Sir Johns (6,100 feet), High (6,300 feet ?), Mossmans (6,600 feet), and Blue Mountain (7,360 feet) Peaks in sequence.

**Belmore Castle** (Trelawny): In the southern Cockpit Country at the end of automobile transportation on the road leading north from Golden Grove (St. Elizabeth), and about 19 airline miles northwest of Mandeville. Collections were made along the forest trail running north toward interior banana plantings, and also around the ranger station at Quickstep, one mile to the south. Altitude about 1,500 feet.

**Catherines Peak** (St. Andrew): 5,050 feet, southern outlier of main Blue Mountain Range, about 2½ airline miles east-southeast of Hardware Gap and 11 airline miles northeast of Kingston. Collected trail from Woodcutters Gap (4,500 feet) to summit.

**Chestervale** (St. Andrew): Coffee plantation in foothills of John Crow Peak, near junction of Yallas and Clyde Rivers about 2 airline miles east-northeast of Catherines Peak. Altitude 3,200 feet.

**Clydesdale** (St. Andrew): Abandoned coffee plantation near the headwaters of the Clyde, 1 airline mile east of Chestervale with which it is connected by 2 miles of excellent rain-forest trail, much used for collecting. Altitude 3,500 feet.

**Cornpuss Gap** (St. Thomas): Collected along trail leading up east side of the east fork of the Island River Valley starting about 3 trail (2 airline) miles north of Bath, at 1,650 feet at point 0.8 trail mile north of United Fruit Co. shed at Barretts Gap, and continuing up 2 miles through banana plantings to forest reserve at about 1,975 feet.

**Morces Gap** (Portland-St. Andrew): Between John Crow Peak on the west and Bellevue Peak on the east. Altitude 4,950 feet.

- Mossmans Peak** (Portland): Collected for 2 miles along the level forest trail leading from Portland Gap west around the north shoulder of the peak, at 5,600 feet.
- New Haven Gap** (Portland-St. Andrew): Between Bellvue and Sir Johns Peaks. Altitude 5,500 feet.
- Port Antonio** (Portland): Port on north coast near east end of island.
- Sir Johns Peak** (St. Andrew): Collected trail leading around south shoulder of peak from saddle (5,750 feet) between Sir Johns and High Peaks through tree fern forest (5,900 feet) and down toward New Haven Gap.
- Stony Hill** (St. Andrew): 8 airline miles due north of Kingston. Altitude 1,150 feet.
- Trafalgar Gap Trail** (Portland): Leads north from Morces Gap (4,950 feet), descending gradually to 4,350 feet in about 2 miles.

## DESCRIPTIONS OF NEW SPECIES AND GENERA

### Genus *PHOTINUS* Motschulsky

A redescription of the genus *Photinus* would be out of place here, but a few words about certain characteristics common to all the species here described and, in most cases, different from those of the other genera considered, will save duplication in the individual descriptions.

In the males of the known Jamaican species of the genus (except *Photinus lucernula* Barber) the photogenic organs of the adult occupy all the ventral surfaces of abdominal segments 6 and 7 (pl. 3, fig. 32), whereas in the female (pl. 3, fig. 33) there is only one organ, occupying part of sternite 6. The photogenic organ, which is usually white or, in life, very pale yellow and is surrounded by a very narrow chalky border formed by the edge of the "reflector" layer of the organ, should not be confused with white sternites due merely to absence of pigmentation. In most species of *Photinus*, in contrast to *Diphotus*, sternites 6, 7, and 8 have a rounded notch, sometimes quite deep, in the middle of the posterior margins, giving a more or less bilobed effect (pl. 3, fig. 32). As in *Diphotus* the tarsal claws are simple (pl. 3, fig. 29). The tibial spur pattern is usually 0-1-1 or 1-2-2. Aedeagal characters have already been mentioned.

#### *PHOTINUS LEWISI*, new species

#### PLATE 1, FIGURE 1; PLATE 2, FIGURE 11

*Field characters*.—Dimensions varying from 6.5 by 2.4 to 8.1 by 3.0 mm. (Average dimensions, with standard errors,  $7.4 \pm 0.5$  mm. by  $2.7 \pm 0.2$  mm.) Pronotum and end of abdomen nearly white, rest of body dark brown to black.

*Male*.—Pronotum averaging 1.5 mm. long by 2.2 mm. wide (though length-width ratio varies from 2:3 to nearly 1:1); shape and proportions variable; sometimes widest before hind angles, front margin usually semicircular, hind angles usually produced backward slightly, basal margin straight in median three-fifths; color entirely white or

with an indefinite and variable brown discal spot, shining. Scutellum and mesonotal plates dark brown. Elytron about 6.2 by 1.3 mm.; uniform dark brown to black; margins subparallel to apical fourth, thence tapering mainly in lateral margin. Head width 1.2 mm. Eye length 0.65 mm. Frons width 0.38 mm., black, slightly concave; interocular margins very slightly divergent. Maxillary palpi medium to dark brown, labial palpi light brown. Antennae 3.1 mm., dark brown, segments 6 to 8 each three times as long as wide. Legs and ventral surface of thorax dark brown. Claws light to medium brown. Tibial spurs short and very difficult to see, distributed usually front leg 1, middle leg 2, hind leg 2, but a few individuals apparently have only one on the hind tibiae. Tergites 1 to 7 dark brown; pygidium white, broad with slight median sagittal ridge, shape variable, hind margin more or less bisinuate and with median angle of variable length and sharpness, sometimes flanked by less prominent lateral angles. Sternites 2, 3, 4, and most of 5 dark brown, the latter with most of hind margin white, 6 to 9 white; 6 very slightly, 7 and 8 fairly strongly and broadly notched at centers of hind margins. Aedeagus (pl. 2, figs. 11, *a-c*) similar to that of *P. evanescens* Barber; white; lateral lobes parallel-sided in basal third, then tapering rapidly, cylindrical and curving evenly nearly to contact at apices, which are slightly knobbed and curved slightly posterodorsally; median lobe moderately broad, nearly covered basally (anteriorly) on dorsal surface by the internally hollowed overlapping basal regions of the lateral lobes, its sclerotized covering light brown dorsally, dark brown and rough laterally at apex, notched deeply on dorsal surface and reaching only to apical fourth of lateral lobes; ventrally the sclerotized shell of the median lobe covers only its lateral surfaces and is slightly expanded near its base.

*Female*.—Fully winged and very similar to male. Pygidium white; wider than long, the sides strongly arcuate in basal half, thence straight and strongly convergent to the truncate apex; rest of tergites dark brown. Photogenic organ in median third of sixth abdominal sternite, other sternites colored as in male.

*Type and paratypes*.—U.S.N.M. No. 57315.

*Distribution*.—Sir Johns Peak (type locality), August 2, 1941, type male and ten male and one female paratypes; Trafalgar Gap trail, July 21, 1941, 1 male paratype; Catherines Peak, July 28, 1941, 3 male paratypes; New Haven Gap, August 2, 1941, 1 male paratype; Mossmans Peak, July 30, 1941, 1 male paratype. Known altitude range, 4,975–5,750 feet.

Named for C. Bernard Lewis, curator of the Science Museum, Institute of Jamaica, in appreciation of his many favors to the expedition.

## PHOTINUS PARDALIS, new species

## PLATE 1, FIGURE 2; PLATE 2, FIGURE 12

*Field characters.*—Length 6.5–7.0 mm., width 2.5 mm. Pronotum uniform white; elytra light brown with many small, irregularly distributed, sometimes confluent, diffuse dark brown spots.

*Male.*—Pronotum 1.3 by 1.9, 1.6 by 2.2, and 1.6 by 2.2 mm. in the three known males; front margin semicircular, lateral margins at hind angles varying from parallel to definitely convergent anteriorly; color uniform white, including disc, but with translucent area over eyes; hind margin nearly straight; hind angles prolonged slightly backward. Scutellum dark brown. Mesonotal plates usually light brown. Elytron averaging 5.4 by 1.2 mm.; light brown with about 30 small irregular diffuse, sometimes confluent, dark brown spots; dull; darker at humerus; nearly parallel-sided to apical fourth, then tapering mainly in lateral margin; vestiture pale. Head width 1.3 mm. Eye length 0.7 mm. Frons width 0.37 mm., black, slightly concave; interocular margins parallel. Maxillary palpi dark brown labial palpi light brown. Antennae 3.0 mm., dark brown, segments 6 to 8 each once and a half to twice as long as wide. Legs and ventral surface of thorax dark brown; claws light brown; tibial spurs very pale and inconspicuous, distributed front leg 1, middle leg 2, hind leg 2. Tergites 1 to 4 light brown, 5 to 8 white; pygidium broad and bulbously ogival, widest at basal third, hind margin produced centrally to blunt point. Sternites 2 to 4 dark brown, 5 to 9 white; 6 slightly, 7 and 8 abruptly notched in center of hind margins; sternites project laterally considerably beyond corresponding tergites. Aedeagus (pl. 2, figs. 12, *a-c*) nearly identical with that of *P. lewisi* but with two differences: the lateral surfaces of the tip of the median lobe and the internal surfaces of the tips of the lateral lobes are toothed, and the ventrobasal sclerotized margins of the median lobe are expanded into small knobs.

*Female.*—Fully winged; 8.4 by 3.5 mm.; more oval than male. Anterior margin of pronotum slightly blunter than in male, 1.9 by 2.8 mm., lateral margins parallel in basal half, basal margin straight. Elytron 6.5 by 1.8 mm.; antennae 3.0 mm. Coloration as in male except that sternite 5 is partly white. Photogenic organ in median half of sternite 6.

*Type and paratypes.*—U.S.N.M. No. 57317.

*Distribution.*—Belmore Castle, August 9, 1941, type male and 1 female paratype; Stony Hill, August 18, 1941, 1 male paratype; half a mile east of Stony Hill, February 10, 1937 (E. A. Chapin, collector), 1 male paratype.

Named for its spotted elytra, unique among known Jamaican lamyrid fireflies.



## PHOTINUS NOTHOIDES, new species

PLATE 1, FIGURE 3; PLATE 2, FIGURE 14

*Field characters.*—Length 5.5, width 1.8 mm. Pronotum and elytra dark brown with white borders, which coincide in the humeral region to give the impression, not well shown in the photograph, of a continuous border around body.

*Male.*—Pronotum 1.0 by 1.5 mm.; approximately semicircular in front, side margins straight and slightly convergent apically in basal third, hind margin slightly emarginate, hind angles acute; disc marked in basal half with a large, approximately rectangular, homogeneous, dark brown spot, which is produced slightly in the middle of its anterior margin and surrounded on side and front margins by a white border of about one-sixth pronotal width. Scutellum and mesonotal plates dark brown. Elytron 4.5 by 0.9 mm.; widest at basal sixth, tapering slightly to apical fifth, thence more sharply in both margins to rounded apex; dark brown (darkest at humerus) with lateral white border of about one-fifth elytral width extending to apical sixth, no sutural border. Head width 0.9 mm. Eye length 0.5 mm. Frons width 0.37 mm., dark brown at antennae, black above; slightly concave; interocular margins very divergent (about 30°). Maxillary and labial palpi light to medium brown. Antennae 1.7 mm., basal two segments medium brown, rest dark brown, segments 6 to 8 each between once and a half and twice as long as wide. Ventral surface of thorax dark brown; all coxae and femora and the entire hind leg white, tibiae and tarsi of front and middle legs medium brown; claws white; no tibial spurs visible (too small?). Tergites medium to dark brown; pygidium damaged. Sternites 2 to 4 dark brown, 5 partly darkened anteriorly, 6 to 9 white; 5 sinuate, 6 to 8 strongly notched in middle of hind margins. Aedeagus (pl. 2, fig. 14, *a-c*): lateral lobes white, laterally flattened and internally hollowed basally, truncated apically to sharp posteroventrally directed tips which curve evenly to contact with each other; dorsal internal margins of lateral lobes well separated and with three scallops; median lobe dorsoventrally flattened, expanded to a pair of lateral teeth at about half, then curving steeply dorsoposteriorly to project between the lateral lobes and end dorsal to their apices in a sharp point; infusate dorsal covering of median lobe medium brown in middle third, otherwise white; median lobe almost entirely membranous ventrally.

*Type.*—U.S.N.M. No. 57318.

*Distribution.*—Catherines Peak, July 25, 1941, type male. Named for its superficial similarity to *Photinus nothus* Barber.

## PHOTINUS HARVEYI, new species

## PLATE 1, FIGURE 4; PLATE 2, FIGURE 13

*Field characters.*—Dimensions 4.4 by 1.7 and 4.6 by 1.9 mm. in the two known males. Pronotum semicircular in front margin, white with yellow disc. Elytra considerably broader than pronotum, medium brown with broad lateral and narrow sutural white borders.

*Male.*—Pronotum 0.9 by 1.3 mm.; front margin semicircular, hind margin straight or slightly emarginate, hind angles slightly acute; disc pale yellow or orange, lighter along side and front margins. Scutellum dark brown. Mesonotal plates light brown. Elytron about 3.6 by 0.9 mm.; nearly parallel-sided to apical fourth where taper begins in both margins; medium brown, lateral border white and about one-fifth elytral width, sutural border white and very narrow; vestiture light, fine, and fairly sparse. Head width 0.83 mm. Eye length 0.5 mm. Frons width 0.27 mm., black, slightly concave; interocular margins slightly divergent. Maxillary palpi medium brown; labial palpi white. Antennae 1.4 mm.; dark brown; segments 6 to 8 each about twice as long as wide. Legs and ventral surface of thorax dark brown; claws light brown; tibial region too small to ascertain spur condition. Tergites 1 to 5 light to medium brown, 6 to 8 white; pygidium ogival, 0.21 by 0.24 mm. Sternites 2 to 4 dark brown, 5 partly infusate basolaterally, 6 to 9 white; 6 slightly, 7 and 8 moderately notched at centers of hind margins. Aedeagus (pl. 2, fig. 13, *a-c*) white except for a slight preapical infuscation of the inner surfaces of the lateral lobes and a strong apical infuscation of the median lobe; lateral lobes slender, flattened laterally, widely separated from median lobe except at apices, evenly curved, tips slightly expanded dorsally and tilted inward at about 45° so as to overlap slightly the tip of the median lobe, toothed along inner surfaces in apical half; median lobe slender, covered dorsally by an apically black sclerotized plate, which extends posteriorly nearly to apices of lateral lobes and is there expanded laterally in a pair of teeth; ventrobasal part of sclerotized sheath of median lobe expanded laterally into small knobs.

*Type and paratype.*—U.S.N.M. No. 57320.

*Distribution.*—Morces Gap, July 16, 1941, type male; Catherines Peak, July 28, 1941, 1 male paratype.

Named for Prof. E. Newton Harvey, of Princeton University.

## PHOTINUS ELISABETHAE, new species

## PLATE 1, FIGURE 5; PLATE 2, FIGURE 15; PLATE 3, FIGURES 21, 32, 33

*Field characters.*—Length 8.0 to 8.5 mm., width about 3.1 mm. Pronotum yellow with dark brown disc. Elytra dark brown with conspicuous white lateral and sutural borders.

*Male*.—Pronotum about 1.8 by 2.3 mm.; variable in contour, the lateral margins sometimes subparallel in basal third, sometimes farthest apart at basal third; front margin usually approximately semicircular, but sometimes produced, slightly upturned and subangulate; basal margin straight except at hind angles, which are produced slightly backward (pl. 3, fig. 21); disc with central dark brown or black area of irregular shape and variable extent, usually one-half to one-fourth the pronotal width in diameter, and sometimes flanked also by more or less distinct longitudinal dark brown stripes of about the length of the disc and about one-fourth pronotal width in from the lateral margins of the pronotum; central part of disc with broad very shallow transverse depression; disc surrounded on sides and in front by broad, flat, yellow-brown border. Scutellum dark brown anteriorly, usually lighter toward its apex. Mesonotal plates dark brown or black. Elytron about 6.5 by 1.5 mm., dark brown, with lateral whitish border up to one-third elytral width and much narrower pale sutural border, the two vaguely confluent at apex; very slightly broader at basal third, main taper begins at apical fourth and in lateral margin only; vestiture fine, light, and inconspicuous. Head width about 1.45 mm. Eye length 0.9 mm. Frons width 0.48 mm., black, slightly concave; interocular margins slightly divergent. Maxillary palpi dark brown, labial palpi dark brown, pale at apices. Antennae 4.0 mm., dark brown, segments 6 to 8 each about three and one-half times as long as wide. Ventral surface of thorax, tibiae, and tarsi dark brown, rest of legs lighter; tibiae much flattened; claws light brown; tibial spurs light brown, small and so inconspicuous that their distribution cannot be specified with assurance, although where clear it is front 1, middle 2, hind 1. Tergites 6 to 8 white, rest infuscate in variable degree; pygidium in shape of broad abruptly truncated triangle, the hind margin being nearly straight (occasionally feebly arcuate) and about two-thirds as wide as the basal margin. Sternites 2 to 4 dark brown, 5 usually so at least anteriorly, 6 to 9 white; 6 slightly, 7 and 8 markedly notched in centers of hind margins (pl. 3, fig. 32) and slightly narrower than corresponding sternites. Aedeagus (pl. 2, fig. 15, a-c) similar to that of *P. chapini* Barber; almost wholly white; lateral lobes white, laterally compressed, outer margins subparallel to apical third where they converge abruptly and narrow dorsoventrally to sharp points directed posteroventrally; inner margins subparallel and well separated in basal third, then divergent to apical third, thence convergent; median lobe moderately broad, dorsoventrally flattened, its dorsal sclerotized surface white basally, black apically, curving dorsally from deeply ventral level to top surfaces of lateral lobes, membranous portion projects dorsally therefrom to pointed apex; dorsal sclerotized surface of median lobe is incised at apex by

basally pointing V, and reaches to about the apical fifth of the lateral lobes; ventral surface of median lobe membranous.

*Female*.—Dimensions 7.5 to 9.0 mm. by about 3.2 mm. Very similar to male. Fully winged and capable of flight. Identification validated by pair taken mating. Sternites 2-6 dark brown except for light organ in median third or quarter of 6 (pl. 3, fig. 33); 7 occasionally, and 8 usually light brown; hind margins sinuate and sometimes very slightly notched in centers. Tergites all dark brown except for 7 and 8, which may be lighter. Head width 1.16 mm. Eye length 0.6 mm. Frons width 0.50 mm. Tibial spurs same as in male.

*Type and paratypes*.—U.S.N.M. No. 57316.

*Distribution*.—Catherines Peak (type locality), July 28, 1941, type male and three male and three female paratypes; June 21, 1936, one female paratype; and July 27, 1936, one female paratype; Mossmans Peak, July 31, 1941, one male and two female paratypes. One of the few species in which more females than males were found.

Named for my wife, Elisabeth Mast Buck, in appreciation of her constant and extensive assistance in the field and laboratory.

#### Genus *DIPHOTUS* Barber

The most conspicuous difference between *Diphotus* and *Photinus* is the restriction of the light organs, in both sexes of the former, to a pair of lateral spots in sternite 8, the usual position of the larval organs in most luminous lampyrids. These are usually small, as in *D. masti* (pl. 3, fig. 34), but occasionally, as in *D. semifuscus* Barber, they occupy nearly all the sternite. Other differences between *Diphotus* and *Photinus* are the presence, in the former, of pinkish or purplish color in some of the viscera, which may show externally through translucent regions such as the pronotal disc and abdomen, the presence of relatively straight posterior margins on the abdominal sternites (pl. 3, fig. 34), and of relatively larger eyes. In place of the one or two rather conical spurs projecting from just behind the distal rim of the tibia in *Photinus*, *Photuris*, and *Presbyolampis*, diphotids have an even close-set circle of more slender spurs projecting distally from the extreme distal rim of the tibia (pl. 2, fig. 17). Strictly speaking these are probably modified hairs, rather than derivatives of the type of spur found in *Photinus*, *Photuris*, and *Presbyolampis*. In forms where they are darker than the leg vestiture (e. g., *D. montanus*, *mutschleri*, *semifuscus*, *bucki*, and *dahlgreni*) they are easily distinguishable from ordinary hairs by their diameters and position, but in forms where both spines and hairs are light colored (e. g., *D. ornicoilis*, *darlingtoni*, and *masti*) the two are often difficult to distinguish from each other.

As already mentioned *Diphotus* has simple tarsal claws (pl. 3, fig. 29), although, as will be noted later, some species have an additional

“thumb” (pl. 3, figs. 30, 35). Aedeagal characters have already been considered, but this additional comment is relevant: Barber, in proposing the genus in 1941, designated as genotype *D. bucki* Barber, a form in which the aedeagus is greatly elongated and similar only to that of *D. masti* described below (pl. 3, fig. 26). However, a survey of aedeagal shapes in known diphotids suggests that there may be complete intergradation between the greatly attenuate lateral and median lobes in the two above mentioned species and the short compact structures of *Microdiphot cavernarum* Barber (pl. 3, fig. 28). Some idea of the size ranges encountered is given by plate 3, figures 26, 27, and 28.

DIPHOTUS DAHLGRENI, new species

PLATE 1, FIGURE 6; PLATE 2, FIGURE 17; PLATE 3, FIGURE 22

*Field characters*.—Length 7.5, width 3.2 mm.; oval; pronotal disc and elytra medium brown with broad white borders; abdominal sternites and tergites progressively darker to black hind end.

*Male*.—Pronotum 1.9 by 2.4 mm.; front margin semicircular, lateral margins subparallel in basal third, hind margin nearly straight; disc medium to dark brown with wide white border anteriorly and laterally, a narrower one along the hind margin. Scutellum and mesonotal plates dark brown. Elytron 5.6 by 1.6 mm.; widest at middle, lateral margin tapering smoothly in both directions; medium red-brown with white lateral border about one-third the elytral width, no sutural border. Head width 1.6 mm. Eye length 1.0 mm. Frons width 0.5 mm., black, deeply concave; interocular margins subparallel. Maxillary and labial palpi light brown to white. Antennae 3.2 mm., dark brown, segments 6 to 8 each a little more than twice as long as wide. Femora, tarsi, coxae, and ventral surface of thorax light brown, tibiae dark brown; claws medium brown; cirlet of about a dozen slender spurs along the distal edge of the tibiae (pl. 2, fig. 17). Tergites grading progressively from light brown tergite 1 to jet black, semicircular pygidium. Sternites progressively darker from light brown (2) to black (7); 8 white, 9 lost, all with hind margins straight except 7 which resembles that of *P. immigrans* (pl. 2, fig. 20). Aedeagus (pl. 3, fig. 22, *a-c*) somewhat similar to those of *D. unicus* Mutschler and *D. semifuscus* Barber; lateral lobes white, closely apposed dorsally, internally hollowed, tapering posteriorly to slender apices tilted slightly dorsally; at apical fourth each lateral lobe has an anteriorly directed hook or tooth on its ventral surface in contact with the median lobe; median lobe white, cylindrical, lying deeply ventral in its basal two-thirds, constricting suddenly at about the level of the apical third of the lateral lobes to a laterally compressed thin sclerotized vane, which curves dorsally between and just short of the tips of the lateral lobes;

ventral surface of median lobe entirely membranous basal to the constriction.

*Type*.—U.S.N.M. No. 57321.

*Distribution*.—Belmore Castle, August 9, 1941, male type.

Named for Prof. Ulric Dahlgren, of Princeton University.

DIPHOTUS DARLINGTONI, new species

PLATE 1, FIGURE 7; PLATE 3, FIGURES 23, 27

*Field characters*.—Length 7.5, width 3.0 mm.; markedly constricted laterally between pronotum and elytra; elytra medium brown, disc dark brown, both with white borders and markedly long pubescence.

*Male*.—Pronotum length 1.8 mm., width 2.3 at half, 2.0 at base; bulbous; apical margin semicircular, basal margin moderately and evenly emarginate, hind angles about 90°; broadly bordered, except at base, in white; disc with dark brown irregular infuscation divided into lateral halves by a lighter, shallow, median sagittal groove; vestiture long and pale. Scutellum medium brown, lighter than elytra are at humeri; mesonotal plates light brown. Elytron 5.8 by 1.5 mm.; widest at basal third, then tapering gradually and evenly in lateral margin only; light brown or white (preservation poor), marked centrally with medium brown vitta, broad at humerus, thinning posteriorly and extending nearly to apex; lateral white border two-fifths elytral width, sutural border considerably narrower and basally obsolete; vestiture long and pale. Head width 1.7 mm. Eye length 0.9 mm. Frons width 0.5 mm.; black and purple mottled, markedly concave; interocular margins subparallel. Maxillary palpi medium brown. Antennae 3.2 mm., dark brown, segments 6 to 8 each about twice as long as wide and with hairs about as long as width of segment. Ventral surface of thorax medium brown; legs light brown; claws light brown; tibial spurs as in *D. dahlgreni* but difficult to see. Tergites progressively darker from light brown (1) to dark brown (pygidium); pygidium damaged, but apparently ogival, broadest just before base, with apical margin bordered in medium brown. Sternites increasingly darker from light brown (2) to dark brown (7), though lighter than corresponding tergites; 8 and 9 light brown; all with straight hind margins. Aedeagus (pl. 3, fig. 23, *a-c*) probably white although pale brown in this poorly preserved specimen; somewhat similar to that of *D. mutschleri* Barber; lateral lobes slender, parallel-sided, dorso-ventrally flattened, horizontal, apposed to apical fourth where they separate laterally and accommodate apex of median lobe, then come together again at apices nearly to contact; median lobe completely ventral to lateral lobes except at apex, which is a sclerotized, laterally flattened vane, which projects between and slightly above the lateral lobes just short of their apices.

*Type*.—Museum of Comparative Zoology No. 26747.

*Distribution*.—Port Antonio, January 4 (no year given), F. C. Bowditch collector.

Named for Dr. P. J. Darlington, Jr., of the Museum of Comparative Zoology.

DIPHOTUS MASTI, new species

PLATE 1, FIGURE 9; PLATE 3, FIGURES 26, 30, 34-38

*Field characters*.—Length 8.0, width 3.0 mm. Pronotum with dark brown semicircular disc surrounded by white border. Elytra nearly parallel-sided, light brown with white borders. Abdomen dark brown, increasing to black at apex.

*Male*.—Pronotum 1.8 by 2.3 mm.; front margin semicircular, lateral margins in one specimen subparallel in basal third, in the other converging slightly at base; hind margin straight except at hind angles which project slightly backward; disc marked with dark brown semicircular spot bisected by vague narrow median sagittal light brown stripe, bordered apically and laterally by a wide, and basally by a narrow white border. Scutellum light brown. Mesonotal plates medium brown. Elytron 6.2 by 1.5 mm., nearly parallel-sided to apical fourth where it tapers sharply, mainly in lateral margin; light to medium brown, darkest at humerus, lateral border white, about one-third of elytral width and confluent at apex with narrower white sutural border. Head width 1.9 mm. Eye length 1.2 mm., projecting beyond pronotum. Frons width 0.5 mm., medium to dark brown, deeply concave; interocular margins parallel or slightly divergent dorsally. Maxillary and labial palpi white. Antennae 4.0 mm.; dark brown with basal segment light brown; segments 6 to 8 each four times as long as wide, and somewhat flattened. Legs and ventral surface of thorax light brown; claws medium brown, simple but with expanded basal plate or "thumb" inside the anterior claws of the front legs (pl. 3, figs. 30, 35) as in *D. bucki* Barber and to a less extent in *D. unicus* Mutschler and *D. ornicolis* Barber; circlet of inconspicuous spurs along distal rim of each tibia. Tergites increasingly dark from medium brown (1) to pygidium, which is brown bordered black, very large, ogival to blunt, with slight rounded projection from middle of hind margin; 7 and 8 broader than corresponding sternites. Sternites increasingly dark from medium brown (2) to black (7); 8 and 9 pale with medium brown apical borders; 9 greatly elongated and with dark recurved hooks and large muscles on internal surface (pl. 3, figs. 36-38) as in *D. bucki* Barber, suggesting its use as an accessory in mating. Aedeagus (pl. 3, fig. 26, a-c) identical in shape, structure, and size with that of *D. bucki* Barber; lateral lobes extremely long and slender, apposed dorsally except briefly at apical

fourth where they separate enough to allow the slender, pointed dorsally directed apex of the median lobe to fit between their tips in a socket formed by ventrally directed teeth, one on the internal ventral margin of the tip of each of the lateral lobes; median lobe flared ventro-basally to nearly the combined widths of the lateral lobes, tapering quickly apically to very slender tip, dorsally curved; median lobe sclerotized only laterally and dorsally, except for small rectangular piece imbedded separately in its ventrobasal membranous area.

*Type and paratype*.—U.S.N.M. No. 57322.

*Distribution*.—Cornpuess Gap, July 25, 1941, type male and one paratype male, latter from spider's web.

Named for Prof. S. O. Mast, of Johns Hopkins University.

#### Genus **MICRODIPHOT** Barber

This genus was erected by Barber originally to accommodate *M. cavernarum* Barber, a form apparently closely allied to *Diphotos* in aedeagal structure and position of photogenic organs, but differing in its minute size, its laterally compressed cylindrical shape, its sinuate elytra, and its pronotum bluntly arcuate in both anterior and posterior margins. *M. barberi*, described below, agrees with the genotype in all the mentioned particulars, thus strengthening the generic segregation of these forms. In addition, as described later, *M. barberi* has a flat frons, and a tibial spur pattern different from all other Jamaican lampyrid genera, agreeing in both these respects also with *M. cavernarum*.

#### **MICRODIPHOT BARBERI**, new species

PLATE 1, FIGURE 8; PLATE 2, FIGURES 18, 19; PLATE 3, FIGURE 24

*Field characters*.—Dimensions ranging from 4.6 by 1.0 to 5.3 by 1.1 mm. Body very slender and nearly cylindrical; elytra and most of abdomen black; pronotum widest at middle and arcuate both in front and hind margins, yellow to pink.

*Male*.—Pronotum 0.9 by 0.9 mm.; nearly flat; widest at middle, tapering equally to front and rear and resembling that of *Microdiphot cavernarum* Barber; apical and basal margins bluntly arcuate, hind angles obtuse; predominantly glistening yellow with irregular pinkish mottling, apical sixth dark brown; narrow deep groove with a prominent row of small indentations close to lateral and apical margins; narrow median sagittal groove to apical fifth. Scutellum flat, elongate, rectangular, light yellow, and sometimes with shallow median sagittal groove. Mesonotal plates white with dark brown borders. Elytron 3.7 to 4.3 mm. long; black or very dark brown, with narrow, white lateral and sutural borders; widest at humerus (0.5 mm.), tapering to 0.4 to 0.45 at basal fourth, then parallel-sided to apical fifth where final taper begins, mainly in lateral margin; elytra slightly sinuate so



that they are not in contact from about half to apices, which are apposed, dull, soft, and turned downward in pinned specimens; vestiture fine, dense, and black. Head width 0.73 mm. Eye length 0.32 mm., protruding slightly beyond anterior margin of pronotum. Frons width 0.29 mm., medium to dark brown, flat, interocular margins parallel to slightly divergent. Maxillary palpi light to medium brown, labials a little lighter. Antennae 2.5 mm.; dark brown, with markedly conical segments of which the terminal and sometimes subterminal ones are light brown; segments 6 to 8 each roughly twice as long as wide. Coxae, trochanters, femora, and ventral surface of thorax light brown, tibiae and tarsi medium brown; tibiae with a circlet of about a dozen short robust spurs on their distal ends and others on their outer surfaces (pl. 2, figs. 18, 19); claws medium brown. Tergites increasingly darker from light brown (1) to black (pygidium); pygidium broad, ogival, abruptly truncated, with apical margin slightly emarginate and about two-thirds the length of the basal margin; 7 and pygidium wider than the underlying sternites. Sternites increasingly darker from light brown (2) to dark brown (7); 8 white and truncated; 9 white with very slight posterior darkening; 7 slightly emarginate, 8 slightly notched at middle of hind margin. Aedeagus (pl. 3, fig. 24, *a-c*) wholly white; lateral lobes parallel-sided in apical two-thirds and tightly apposed dorsally except where diverging slightly near apex to accommodate the laterally compressed apex of the median lobe; lateral margins of lateral lobes converging abruptly at apical fifth to blunt tips directed posteroventrally; median lobe cylindrical to apical third where it is laterally compressed to blade, which projects dorsally between lateral lobes; each lateral lobe armed with a recurved hook at apical third on ventral internal margin.

*Type and paratypes.*—U.S.N.M. No. 57319.

*Distribution.*—Morces Gap (type locality), July 16, 1941, type male and five paratype males.

It is a pleasure to dedicate this attractive species to H. S. Barber, of the U. S. Bureau of Entomology and Plant Quarantine.

#### PRESBYOLAMPIS, new genus

This name is proposed for the species below described, the male of which differs from all other known Jamaican lampyrids in the distinctive structure of its aedeagus, in the fact that both tarsal claws on each foot are cleft (neither is cleft in *Photinus* and *Diphotus*, one is in *Photuris*), in the shape of the pronotum, and in a number of other characters. In the bifurcation of the claws and possibly in its aedeagal structure this new form resembles one I collected at Ceiba, Honduras, in August 1941. This latter form, Mr. Barber informs me, is probably *Photuris amoena* Gorham, 1880, described from Guatemala. Both

Mr. Barber and I, however, are agreed that neither of these forms belongs in *Photuris*, and Mr. Barber further thinks, on comparing them with samples of *Bicellonycha* Motschulsky, 1853, in the collection of the National Museum, that neither belongs there, although the cleft claws are a feature of the original description of *Bicellonycha*. Moreover, there is considerable doubt whether the genonym *Bicellonycha* is available anyway, because its originally designated genotype, *Lampyris albilatera* Gyllenhal, 1817, is believed by Mr. Barber to be properly assigned to the genus at present called *Photinus*.

Type of genus: *Presbyolampis immigrans*, new species, described below.

For the time being I am leaving open the question of whether the new Jamaican form and the Honduran one are congeneric, but there is sufficient resemblance to open up interesting speculations on the possible position of *Presbyolampis* as a descendant of ancient waif migrants from the Central American mainland across water gaps, as argued by Darlington (1938).

PRESBYOLAMPIS IMMIGRANS, new species

PLATE 1, FIGURE 10; PLATE 2, FIGURE 20; PLATE 3, FIGURE 25, 31

*Field characters*.—Length 8.0 to 8.5 mm., width 3.5. Both tarsal claws of each foot bifid; photogenic organs occupying only median half to third of abdominal sternites 6 and 7; sternite 8 with long slender point projecting posteriorly from middle of posterior margin; pronotum conspicuously short; elytra uniform dark brown to black.

*Male*.—Pronotum about 1.6 by 2.7 mm.; front margin blunt, but in two out of three specimens is produced at center to obtuse peak; side margins subparallel in basal half; hind margin sinuous, with hind angles produced posteriorly to conspicuous acuteness ( $60^\circ$ ); margins slightly uptilted at sides, markedly so in front; disc black, lateral borders white, apical border light brown; surface glistening and roughly pebbled; vestiture fine, dark, and very sparse. Scutellum dark brown centrally, light brown at margins. Mesonotal plates black. Elytron about 6.6 by 1.6 mm., uniform dark brown except for very narrow lateral white border and even narrower sutural one; parallel-sided to apical third where taper begins, mainly in lateral margin; surface as in pronotum. Head width 1.75 mm. Eye oval, 1.1 by 0.9 mm. and projecting from beneath pronotum. Frons width 0.6 mm.; very concave; medium to dark brown, then suddenly black dorsally; interocular margins very divergent ( $30^\circ$ ). Maxillary and labial palpi light brown to white and of similar subconical shape. Antennae 2.8 mm.; medium brown; segments 6 to 8 each two and one-half times as long as wide, with rather long vestiture. Tibiae,

tarsi, and ventral surface of thorax medium brown, coxae and femora white, tibiae thinner and more cylindrical than typical in *Photinus* and *Diphotos*; both claws of all feet bifid, with the inner of the two points shorter than the outer (pl. 3, fig. 31); tibial spurs light brown, distributed front 2, middle 2, hind 2. Tergites 1 to 6 medium brown, 7 and pygidium white laterally; pygidium ogival. Sternites 2 to 5 medium brown, 6 and 7 white except for medium brown anterior border of 6; 8 and 9 with some light brown areas; hind margins of 6 and 7 only very feebly emarginate, that of 8 prolonged medially to a slender point, closely applied to and overlapping the slender 9 (pl. 2, fig. 20); photogenic organs as in no other known male Jamaican firefly (except *P. lucernula* Barber), confined to central half or third of abdominal sternites 6 and 7 (pl. 2, fig. 20, *O*, cross-lined). Aedeagus (pl. 3, fig. 25, *a-c*) very different from that of any other known Jamaican firefly; wholly white; lateral lobes forming broad, dorso-ventrally flattened, horizontal, thin, warped blades nearly meeting in median sagittal line and concealing the median lobe almost entirely, curving ventrally along lateral margins and tapering gradually to sharply pointed apices which are directed posteroventrally and provided with a few long chaetae; median lobe emerges from basal folded membranous collar as roughly cylindrical membranous mass, apparently with ventral functional opening, and bends dorsally near its apex to a point below the tips of the lateral lobes.

*Type and paratypes*.—U.S.N.M. No. 57315.

*Distribution*.—Morces Gap, July 16, 1941, type male and two paratype males.

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## EXPLANATION OF PLATES

### PLATE 1

#### *Dorsal Views*

[In trimming the photographs the legs, which ordinarily project laterally beyond the elytra, were removed. In some specimens the abdomens were removed for study, and this accounts for the lightness of the area between the elytra. A few regions have been retouched slightly to restore contrast. The whitish specks on some of the elytra (e. g., fig. 10) are highlights.]

- 1, *Photinus lewisi*; 2, *Photinus pardalis*; 3, *Photinus nothoides*; 4, *Photinus harveyi*; 5, *Photinus elisabethae*; 6, *Diphotus dahlgreni*; 7, *Diphotus darlingtoni*; 8, *Microdiphot barberi*; 9, *Diphotus masti*; 10, *Presbyolampis immigrans*.

### PLATE 2

#### *Detailed Structure*

[Figures in *a, b, c* series represent dorsal, left lateral, and ventral views, respectively, of a single aedeagus, with the basal or anterior end upward. Magnification is not uniform but can be judged from the scale lines included, which are all 0.5 mm. In fig. 20 (and also figs. 32-34 of pl. 3) the relative widths of the sternites are not shown accurately because the camera lucida does not take account of their varying curvatures, which become foreshortened.]

- 11, Aedeagus of *Photinus lewisi*, new species (*LL*=lateral lobe, *ML*=median lobe, *B*=basal piece); 12, aedeagus of *Photinus pardalis*, new species (*IS*=internal sac); 13, aedeagus of *Photinus harveyi*, new species; 14, aedeagus of *Photinus nothoides*, new species; 15, aedeagus of *Photinus elisabethae*, new species; 16, inside or ventral surface of tibia of hind leg of *Presbyolampis immigrans*, new genus and species (*TI*=tibia, *TA*=most proximal tarsal segment, *S*=spur; same labels apply to figs. 17-19); 17, ventral surface of tibia of left middle leg of *Diphotus dahlgreni*, new species, showing spurs (same magnification as fig. 16); 18, ventral surface of tibia of left middle leg of *Microdiphot barberi*, new species, showing spurs (magnification same as fig. 13); 19, front view of leg shown in fig. 18 showing how spurs are distributed along outer surface of tibia; 20, ventral view of posterior part of abdomen of male of *Presbyolampis immigrans* showing photogenic organs (*O*, cross-lined) on sternites 6 and 7, posterior projection of sternite 8, and pygidium (*P*).

### PLATE 3

#### *Detailed Structure*

[See note under Plate 2]

- 21, Part of pronotum (*PR*) and elytra (*EL*) of *Photinus elisabethae*, new species, showing the mesonotal plates (*MP*) and their relation to the scutellum (*SC*); 22, aedeagus of *Diphotus dahlgreni*, new species; 23, aedeagus of *Diphotus darlingtoni*, new species; 24, aedeagus of *Microdiphot barberi*, new species; 25, aedeagus of *Presbyolampis immigrans*, new genus and species; 26, aedeagus of *Diphotus masti*, new species; 27, aedeagus of *Diphotus darlingtoni* reproduced to same scale as that of *D. masti* (fig. 26) to show the enormous absolute size difference possible in diphotids of about the same over-all size; 28, aedeagus of

*Microdiphot cavernarum* Barber, the smallest known Jamaican firefly (3.5 mm.), reproduced to same scale as figs. 26 and 27 to illustrate the extremes in known aedeagal absolute size and the fact that fireflies differing greatly in body size may differ less in aedeagal size; 29, claws of *Photinus elisabethae* illustrating the usual type in *Photinus* and *Diphotus* (this and the other claw drawings same magnification as fig. 13); 30, claws of left front leg of *Diphotus masti*, new species, showing enlarged plate or "thumb" (*T*), which points diagonally downward and is here foreshortened (see fig. 35); 31, claws of *Presbyolampis immigrans* showing bifid structure; 32, ventral view of part of abdomen of male of *Photinus elisabethae* showing position of photogenic organs (*O*, cross-lined); 33, ventral view of part of abdomen of female of *Photinus elisabethae* showing position of photogenic organ (*O*, cross-lined); 34, ventral view of part of abdomen of *Diphotus masti* showing position of photogenic organs (*O*, cross-lined); 35, side view of left front claw of *Diphotus masti* showing "thumb"; 36, dorsal surface of posterior end of sternite 9 of *Diphotus masti* showing recurved hooks (same magnification as fig. 37); 37, side view of sternite shown in figs. 36 and 38; 38, dorsal view of inner surface of sternite 9 of *Diphotus masti* showing recurved hooks at apex, its greatly elongated shape, and the muscles (*m*) attached at both ends.